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AMSAT NEWS SERVICE
ANS-194

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to:
ans-editor at amsat.org.

In this edition:

* UKube-1 with FUNcube-2 payload launched!
* AMSAT Prepares for ARRL Centennial Celebration
* UKube-1 Signals Received
* ISEE-3/ICE spacecraft fires thrusters for a return to Earth
* DX-1 Appeal to radio hams from Dauria Aerospace
* MEO and HEO satellite orbits
* Surrey Space Centre – UK CubeSail Satellite
* AMSAT Events
* ARISS News
* Satellite Shorts From All Over

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ANS-194 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 194.01
 >From AMSAT HQ KENSINGTON, MD.
DATE July 13, 2014
To All RADIO AMATEURS
BID: $ANS-194.01

UKube-1 with FUNcube-2 payload launched!

UKube-1 was successfully launched and deployed July 8th from the Soyuz-2-1B/Fregat-M launch vehicle as a secondary payload. The launch took place as planned at 15:58 UTC from Baikonur in Kazakhstan.

The primary payload was Russia’s Meteor-M2 weather satellite. Additional secondary payloads (according to eoportal.org) included:
* Baumanets-2, a technology microsatellite (~100 kg) of BMSTU (Bauman Moscow State Technical University.

* Monika-Relek (or MKA-PN2), a Russian microsatellite (solar and magnetosphere research)
* Venta-1 / V1-QSPnP1 (V1-QuadSat-PnP-1) the first nanosatellite (7.5 kg) project of Latvia built by LatSpace SIA of Ventspils.
* TechDemoSat-1 of SSTL, UK with a mass of ~160 kg
* DX-1 (Dauria Experimental-1) of Dauria Aerospace, Russia's first private microsatellite with a mass of 22 kg.
* SkySat-2 of Skybox Imaging Inc. of Mountain View, CA, USA, a commercial remote sensing microsatellite of ~100 kg.
* AISSat-2, a nanosatellite with a mass of 6.5 kg of Norway.
* UKube-1 is a 3U cubesat and carries a FUNcube educational beacon and linear transponder similar to AO-73 (FUNcube-1). Beacon signals were heard soon after launch by the UKube team at 19:16 UTC.

Frequencies in use by UKube-1 include:
* 145.840 Primary telemetry downlink CW or 1k2-9k6 BPSK
* 145.915 FUNcube-2 telemetry 1k2 BPSK
* 145.930-145.950 FUNcube-2 transponder downlink,
* 435.080-435.060 uplink
* 2401.0 S-band downlink (QPSK-OQPSK)
* 437.425-437.525 myPocketQub spread spectrum

Transponder and data downlinks operation will be variable during checkout and early operations.

Check ANS, http://funcube.org.uk/, and http://amsat-uk.org/ for the most recent updates.

[ANS Thanks AMSAT-NA and AMSAT-UK for the above information]

AMSAT Prepares for ARRL Centennial Celebration

AMSAT is preparing for its participation at the ARRL Centennial Celebration and National Convention in Hartford Connecticut July 17 through 19.

On Thursday an AMSAT team with present the all day Training Track, "An Introduction to Amateur Satellites."

AMSAT President Barry Baines, WD4ASW will be the facilitator for the event which will begin at 8:30 am and run through 4:30pm. Baines explains, "The training session is to serve as a 'Soup to Nuts' approach to getting started with working Amateur Radio Satellites."

Baines will lead the training with an Overview of the History of Amateur Radio in Space, including our future.

Director of Educational Outreach Joe Spier K6WAO will cover Understanding Orbits, Kepler Elements and Doppler Shift.

V.P. for Educational Outreach E. Mike McCardel KC8YLD will discuss Satellite Tracking and Tracking Software with an emphasis on SATPC32.

Director Field Operations Patrick Stoddard WD9EWK/VA7EWK and Area Coordinator Peter Portanova W2JV will address Station Configuration and Satellite Operation including general operation, Easy Sats, FM Birds, CW and SSB Birds and telemetry;

AMSAT Fox-1 Software Team Co-Leader Burns Fisher W2BFJ will present an overview and discuss the capabilities of AMSAT's Fox-1 Satellite due to launch in 2015.

AMSAT will also host a Forum, "An Overview of AMSAT" Friday at 2pm in room 25. Immediately following the Forum Peter Portanova W2JV will present "Working the Amateur Radio FM Satellites with Your HT", in the same room.

Throughout the weekend AMSAT will be staffing Booths 500 and 501. The booth will feature the legacy of Amateur Radio in Space with prototypes and models of OSCAR-1, AO-07, and Fox-1 on display.

For more information on the ARRL Centennial and National Convention visit WWW.ARRL2014.org.

[ANS thanks AMSAT-NA for the above information]

UKube-1 Signals Received

The UKube-1 satellite was successfully launched on Tuesday, July 8, 2014 at 1558 UT from Pad 31/6 at Baikonur in Kazakhstan. The 145.840 MHz beacon signal was received by the UKube team in Chilbolton at 19:16 UT.

It had been expected the first signal would be received over South Africa at about 18:52 UT but no signals were heard. The UKube team at Chilbolton and radio amateurs across the British Isles and Europe anxiously awaited the satellite coming within range, when it did a strong signal was heard from the satellite.

Practical Wireless magazine VHF columnist Tim Kirby @G4VXE was one of the radio amateurs listening, he tweeted "Pleased to receive CW from UKube-1 on the first pass over the UK".

Signals have also been received from DX-1 and the SSTL research satellite TechEdSat which were on the same launch as UKube-1.

UKube-1 carries a set of AMSAT-UK FUNcube boards which provide an educational beacon for use by schools and a linear transponder for amateur radio communications.

The first submitters of UKube-1 telemetry data to the FUNcube Data Warehouse were:
DK3WN
OO1A
F-60429
G0PGL
G4GUO
PD3T
M0LTC
The team is currently analyzing the data.

The UKube team has asked that all stations continue to monitor the downlinks and where possible to forward their reports as follows:
- CW beacon on 145.840 MHz to operations(a)funcube.org.uk and

steve.greenland(a)clyde-space.com
- FUNcube telemetry on 145.915 MHz – your existing dashboard will not display properly (except for the Fitter Messages!) but it WILL be forwarding it to the Warehouse correctly and the data will be very useful for the team.

Dashboard App – Telemetry Decoder
http://funcube.org.uk/working-documents/funcube-telemetry-dashboard/

Data Warehouse – Telemetry Archive http://warehouse.funcube.org.uk/

Nico Janssen PA0DLO has posted on the AMSAT Bulletin Board that Doppler measurements suggest that UKube-1 is either object 40074, 2014-037F, or object 40075, 2014-037G. The separation between these objects is now only 1 s, so no more than 7.5 km.

Keplerian Two Line Elements (TLEs) 'Keps' of new satellites launched in past 30 days
http://celestrak.com/NORAD/elements/tle-new.txt

UKube-1 frequencies:
• 145.840 MHz Telemetry downlink
• 145.915 MHz FUNcube subsystem beacon
• 400 mW inverting linear transponder for SSB and CW
- 435.080-435.060 MHz Uplink
- 145.930-145.950 MHz Downlink
• 2401.0 MHz S Band Downlink
• 437.425-437.525 MHz UKSEDS myPocketQub Downlink

There will be a presentation on the UKube-1 FUNcube-2 amateur radio payload at the AMSAT-UK International Space Colloquium being held at the Holiday Inn, Guildford, GU2 7XZ on July 26-27, the event is open to all, further details at
http://amsat-uk.org/colloquium/colloquium-2014/

Peter Goodhall @2E0SQL made this recording of UKube-1 CW and Data
https://soundcloud.com/peter-goodhall/ukube-1-satellite-first-pass-over-the-uk

UK Space Agency announcement
https://www.gov.uk/government/news/successful-launch-for-uk-space-agencys-first-cubesat-mission

UKube-1 Launch Information
http://amsat-uk.org/2014/07/03/ukube-1-launch-information/

[ANS thanks AMSAT-UK the above information]

ISEE-3/ICE spacecraft fires thrusters for a return to Earth

AMSAT-DL report a team of engineers, space enthusiasts and radio amateurs have succeeded in firing the thrusters of the NASA-abandoned ISEE-3/ICE spacecraft.

The plan on Tuesday, July 8, was to fire the thrusters for a total of 7 sequences with breaks for telemetry analysis. While this would have resulted in a velocity change of 7 m/s, the course correction is

required for the lunar swing-by on Aug 10, 2014 then to enter a stable orbit around Earth. However after the first firing sequence the remaining sequences were cancelled due to the returned telemetry data, which is being analyzed. A second attempt was planned for July 9.

The ISEE-3 Reboot Project (IRP) team attempted this main trajectory correction maneuver following a first short thruster firing on July 2, which increased the rotation rate of the spacecraft to the required value. This was possible due to international collaboration between the IRP, and a team of AMSAT-DL and Bochum observatory with its 20 m diameter radio telescope which received and processed critical real-time data of the maneuvers.

While the IRP has access to the Arecibo observatory which, at 305 m diameter, is the largest single-dish radio telescope in the world, downlink support from Bochum is required as Arecibo cannot transmit and receive simultaneously.

Two members of the AMSAT-DL Bochum team will be giving presentations on their reception of ISEE-3 at the AMSAT-UK International Space Colloquium on Saturday, July 26, 2014 at the Holiday Inn, Guildford, GU2 7XZ, United Kingdom. The event is open to all, further details at http://amsat-uk.org/colloquium/colloquium-2014/

Real-time telemetry from ISEE-3 is displayed at http://amsat-dl.org/

ISEE-3
http://spacecollege.org/isee3

Read the Daily Mail story at
http://www.dailymail.co.uk/sciencetech/article-2684345/Zombie-spacecraft-rescued-abyss-fires-thrusters-time-20-years.html

[ANS thanks AMSAT-UK for the above information]

DX-1 Appeal to radio hams from Dauria Aerospace

The DX-1 satellite, built by Dauria Aerospace, launched from Pad 31/6 at Baikonur in Kazakhstan on Tuesday, July 8, 2014 at 15:58:28 UT. It weighs 27 kg and is 40x40x30 cm. Dauria Aerospace have posted the following information:

Finally, close to the accomplishment of our long-awaited event – the launch of the spacecraft DX1 Tuesday, July 8. We would like to ask for help to all radio amateurs who are interested in receiving signals spacecraft. Invite you to participate in the “catching” our satellite immediately after the start.

Start will be at 19:58 Moscow time from the Baikonur cosmodrome. Based on the parameters of the orbit, its separation from the upper stage and the inclusion happen over Eastern Europe, and it will return to Russia after only a few turns of a few hours from the Far East. Therefore, our MCC in Moscow will hold the first session the next day. Beacon satellite broadcasts in amateur radio frequency, so everyone will be able to hear it before us. Moreover, such aid, we need to clarify and confirm its orbit performance. Therefore, our

gratitude will be backed up souvenirs for the lucky hunters from around the world.

Parameters of the radio beacon mode:

Carrier frequency: 438.225 MHz [it is understood there is a 145 MHz command uplink]
The protocol used: AX.25
Call Sign source: DSC001
Call Sign Receiver: Dauria
Size TMI frame within AX.25 packet: 55 bytes
Speed: 9600 bit / s
Modulation GFSK

It is understood the satellite will also be using the following frequencies:
• 162.0125-162.0375 MHz Uplink – AIS ship tracking receiver
• 2269.5-2270.5 MHz Downlink – Data

Dauria Aerospace
http://dauriaspace.com/ Blog
http://tinyurl.com/Dauria-Aerospace-Blog

DX-1 Microsatellite to launch from Baikonur
http://amsat-uk.org/2014/04/27/dx-1-microsatellite-baikonur/

[ANS thanks AMSAT-UK for the above information]

MEO and HEO satellite orbits

The paper Revisiting elliptical satellite orbits to enhance the O3b constellation by Lloyd Wood, Yuxuan Lou and Opeoluwa Olusola of the University of Surrey is now available for download.

Early low-orbiting satellites were launched into Highly Elliptical Orbits (HEO) as a result of not having much control over trajectory. Circular orbits with minimal eccentricity offer consistent altitudes, with the benefits of consistent free space losses and link budgets throughout the orbit, and soon became the norm. Highly elliptical orbits fell from favour for communications use.

Highly elliptical orbits can be used to provide targeted satellite coverage of locations at high latitudes. We review the history of use of these orbits for communication. How elliptical orbits can be used for broadband communication is outlined. We propose an addition of known elliptical orbits to the new equatorial O3b satellite constellation, extending O3b to cover high latitudes and the Earth’s poles. We simulate the O3b constellation and compare this to recent measurement of the first real Internet traffic across the newly deployed O3b network.

Download the paper from
http://arxiv.org/pdf/1407.2521v1

[ANS thanks AMSAT-UK for the above information]

Surrey Space Centre – UK CubeSail Satellite

CubeSail is an exciting, ground-breaking educational satellite project at the Surrey Space Centre (SSC) that hopes to launch into a 680 km Sun Synchronous Orbit (SSO) from India in December 2014.

A key feature is the deployment of a 25 square metre sail structure, which will be used to demonstrate the propulsive effect of solar radiation pressure (i.e. solar sailing) and will demonstrate the de-orbiting capabilities of the sail as a drag augmentation device. CubeSail will be the first launched three-axis stabilised solar sail.

CubeSail will build on small satellite experience at SSC, such as the STRaND-1 nanosatellite, launched on February 25, 2013. Furthermore, the mission critical sail deployment mechanism has undergone an extensive testing and validation process as part of the ESA Gossamer Deorbiter project carried out at SSC. The CubeSail project is also financially and technically supported by world leading industrial partners, Astrium and Surrey Satellite Technology Ltd.

CubeSail is a 3U CubeSat project with a 6kg mass, the mission aims are :

• Technology Demonstration 1: Deployable Sail- The CubeSail satellite will deploy a large (up to 5×5 metre) square aluminised Kapton sail, using novel CFRP deployable booms.

• Technology Demonstration 2: Solar Sailing – The CubeSail mission will demonstrate ‘solar sailing’ in LEO by utilising the solar radiation pressure on the reflective sail to change its orbital inclination.

• Technology Demonstration 3: Attitude Control CubeSail is equipped with 3-axis-stabilizing attitude determination and control system. A novel capability of this system is pointing via a centre-of-mass/centre-of-pressure (COM/COP) offset.

• Technology Demonstration 4: Drag Deorbiting -The satellite will deorbit much more quickly than otherwise due to its deployable sail. Satellite pointing will be optimized by the attitude control system for maximum drag.

• Outreach – The satellite will provide beacons for which amateur satellite users and ham radio users will be able to receive. Proposing a 9600 Bit/s AX.25 RC-BPSK downlink

The IARU Satellite Frequency Coordination Panel have coordinated a downlink frequency of 435.240 MHz.

CubeSail
http://www.surrey.ac.uk/ssc/research/space_vehicle_control/cubesail/

[ANS thanks AMSAT-UK for the above information]

AMSAT Events

Information about AMSAT activities at other important events around the country. Examples of these events are radio club meetings where AMSAT Area Coordinators give presentations, demonstrations of working amateur satellites, and hamfests with an AMSAT presence (a table with AMSAT literature and merchandise, sometimes also with presentations, forums, and/or demonstrations).

Thursday through Sunday, 17-20 July 2014 – ARRL Centennial Convention in Hartford CT. AMSAT will host a day-long Satellite Workshop on Thursday, and have a booth at the convention along with an AMSAT Forum and demonstrations throughout the convention.

Friday through Sunday, 12-14 September 2014 – ARRL Southwestern Division Convention 2014 in San Diego CA(north of the city center, near Montgomery Field airport & I-805/CA-163 interchange) – AMSAT will have a booth at this convention, there will be on-air demonstrations using satellites throughout the convention, and a presentation on amateur satellites and AMSAT

[ANS thanks AMSAT-NA for the above information]

ARISS News

+ A direct contact with students at DLR School Lab, Braunschweig, Germany, via DH1ALF was successful Fri 2014-07-11 09:37:47 UTC 66 deg. During the interview which was conducted in German, students asked 13 questions of astronaut Alex Gerst, KF5ONO.

The German Aerospace Center (DLR) is one of Europe's largest and most modern research institutions. Here is where the aircraft of the future are being developed and pilots trained, rocket engines tested and images of distant planets analyzed. In addition, over 7,700 DLR staff members are investigating next-generation high-speed trains, environmentally responsible methods of generating energy, and much more ...

DLR School Lab in Braunschweig investigates many topics related to transportation: whether on the road, rails, or in the air. In various experiments, school classes can acquaint themselves with the research topics being studied at the science institutes at DLR Braunschweig.

+ A Successful contact was made between DLR Project Lab, Neustrelitz, Germany and Astronaut Alexander Gerst KF5ONO using callsign DPØISS. The contact began 2014-07-02 12:05:13 UTC and lasted about nine and a half minutes. Contact was direct via DL1BLV. ARISS Mentor was Francesco IKØWGF.

Upcoming ARISS Contact Schedule

ARISS offers congratulations the following mentors who have now mentored over 100 schools:
Gaston ON4WF with 117
Satoshi 7M3TJZ with 102

Francesco IKØWGF with 102

[ANS thanks ARISS, Charlie AJ9N and David AA4KN for the above information]

Satellite Shorts From All Over

Louisiana Tech University Online Course -- Steps to STEM

NASA Education Resources for STEM Engagement - Louisiana Tech University is teaming up with NASA's Marshall Space Flight Center to offer a 10-week course for educators interested in putting a space-themed twist on learning. The course is designed to be a self-paced, online professional development experience focusing on science, technology, engineering, and mathematics, or STEM, education resources available from NASA. These resources have application methods for use in grades 4-9 classrooms with the goal of advancing high quality STEM education utilizing NASA's unique capabilities.

Applications are due Aug. 30, 2014.

For more information and to enroll in the course, visit http://scitecatlatech.weebly.com/opeo.html.

Questions about these courses should be directed to Amy McDowell at amy.mcdowell(a)nasa.gov

[ANS thanks the NASA Education Express Message -- July 10, 2014 for the above information]

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status. Contact Martha at the AMSAT Office for additional student membership information.

73,
This week's ANS Editor,
Joe Spier, K6WAO
k6wao at amsat dot org